KAPITEL 3 / *CHAPTER 3* [3]
DEVELOPMENT OF FOOD E-TRADE THROUGH DIGITAL PLATFORMS

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Introduction

Food e-trade has been around for decades (Hiser et al., 1999). However, over the past decade, the e-trade volumes have grown and the online food shopping formats have expanded. Consumers use various digital platforms for online shopping.

The accelerated development of e-trade in the food sector was caused by various factors, in particular, the growth of consumer demand, more intensive use of digital devices, services and platforms, Internet penetration, growing consumer confidence in the security of electronic payment systems, as well as quarantine restrictions due to the global pandemic of COVID-19 in 2019-2020 (Reardon et al., 2022).

Digital food markets are growing faster in Asia (especially India and China), slower in Europe and Africa, partly due to competition and high transaction costs for transportation and delivery. The development of food electronic trade in the world was also facilitated by the investments of large online retailers, logistics intermediaries and transport companies.

Statistics show the growth of global electronic trade in agricultural and food products in the B2B and B2C sectors. The global B2B e-commerce market in the agriculture sector reached USD 6.90 billion in 2021 and is expected to grow to USD 11.86 billion by 2030; the compound annual growth rate (CAGR) is 6.4% (Polaris Market Research, 2022).

In terms of B2C e-commerce, the global food and beverage market was valued at USD 57.09 billion in 2022 and is expected to grow to USD 69.77 billion in 2023; CAGR is 22.2%. Due to Russia's war against Ukraine, the pace of global economic recovery after the COVID-19 pandemic has slowed down. As a result of economic sanctions and inflation, the EU food prices have increased, and supply chains have been disrupted. At the same time, in the conditions of growing demand for food and adaptation of governments, businesses and consumers to crisis factors and threats to

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food security, the growth of the world market of electronic trade in food and beverages is predicted to reach 140.42 billion USD in 2027 with CAGR of 19.1% (The Business Research Company, 2023).

The active development of the food sector together with changes in consumer habits in the post-pandemic period have led to structural changes in food markets around the world (Kliuchnyk, 2020). The traditional model of food trade, in which producers sell food products through wholesalers to retailers, restaurants and hospitality establishments, is becoming less reliable and vulnerable to various threats to food security. Changes in consumer preferences and the digital transformation of food markets have led to the displacement of traditional offline trading models by complex interactive digital ecosystems of online food suppliers (FSA, 2021). Consumers have a wide range of choices and can save money and time by ordering food online. The traditional offline value chain has expanded through interaction with digital platforms and delivery networks, providing customers with greater convenience, a greater variety of food products and services. In the future, digital platforms, together with delivery networks, will be serious players in the retail food markets, increasing the volume of e-commerce in food. Therefore, their research and understanding of the contribution to the development of electronic food trade and ensuring food security is important at the current stage.

3.1. Digital platforms: definition, features of business model and role in food trade

Due to the development of the digital economy, new business models have changed the modern business environment of interaction between enterprises and consumers. Businesses have started to use digital technologies and adapt their business strategies to the digital economy. Digital platforms as new market actors are actually mediators between businesses, consumers and other participants, contributing to the improvement of interaction between participants of trade and economic relations in the

digital space. Digital platforms do not buy, produce or sell goods, but only facilitate trade between sellers and buyers. They create a digital environment and institutional structure, form the rules of interaction of participants (Kenney et al., 2016).

Digital platforms are spaces that facilitate collaboration and mediate interactions among users (clients) and providers (suppliers), integrated into the networks (McIntyre et al., 2017; Parker et al., 2016). The user network is a pool of people using the same good or service, while the supplier network is represented by the group of vendors providing the goods or services (Frels et al., 2003).

Digital platform is an online environment that facilitates interaction, information exchange, and transactions between different users or groups of users. Marketplace is a virtual place where buyers and sellers come together to conduct commercial transactions. That is, the digital platform is used for various purposes, such as information exchange, marketing promotion, distribution of proposals for goods and services, search for partners and projects, as well as e-commerce; whereas the marketplace is used exclusively for e-commerce.

Digital platforms differ in types, functions and structure, covering different sectors of the economy, goods and services sold through the platform, and facilitating business-to-customer (B2B), business-to-customer (B2C), or even customer-to-customer (C2C) transactions. They support online interaction between market participants, blurring the geographical boundaries of offline markets and contributing to the integration of enterprises into the digital environment. Digital technologies enable the co-creation of a product and service and contribute to the multiplier effect through the use of network effects.

Digital platforms make it possible to control resources and assets that are outside the physical boundaries of the enterprise. The performance of a digital platform depends on its ability to leverage assets outside of its direct control. Due to the widespread distribution of digital platforms, the involvement of more participants, both users and enterprises, marketing strategies and promotion tools, and the development of mobile applications, digital platforms expand the network of potential cooperation, increasing potential benefits for users and creating additional value (Parker et al.,

2016). In addition, digital platforms scale to other markets and countries, so the greater the coverage of the digital network, the more stable the connection between users and the business is resistant to external challenges and threats (Zhu et al., 2019).

Digital platforms in the food sector have many advantages, as the supply chain in this industry is very complex, involving many players, from farmers and food processors to wholesalers, retailers and restaurants and other intermediaries. Therefore, the emergence of digital food e-trade platforms has significantly changed the structure of the food supply chain.

Digital platforms contribute to increasing the efficiency and transparency of the food supply chain. The digital platform connects consumers and all industry players, optimizes the ordering and delivery process, and reduces the time and costs of logistics that exist in the offline supply chain. Digital platforms provide transparency throughout the supply chain, allowing buyers to trace the origin of their food and control its quality and safety.

Digital platforms give food producers direct access to buyers without intermediaries, enabling manufacturers to sell their products directly to consumers, reducing costs and increasing profits. This business model of e-trade through digital platforms allows manufacturers to build closer relationships with their customers, receive feedback and improve products.

Digital platforms enable greater flexibility and resilience of the food supply chain. Thanks to analytics, data processing, artificial intelligence systems, these platforms monitor consumer behaviour, adapting products and services to the preferences of the target audience. This includes personalized recommendations relevant to customer needs, customized packaging and delivery methods.

Finally, digital platforms contribute to the sustainability of food systems through greater transparency and traceability throughout the supply chain. Platforms help manufacturers implement sustainable business practices, reduce logistics costs.

Digital platforms help transform food supply chains through increased efficiency and transparency, direct access to customers, greater flexibility and resilience to external challenges and threats. The development of digital e-commerce platforms will

help create a more efficient, transparent and sustainable food industry.

Thanks to the development of digital technologies and the growing demand for food in digital markets, companies are able to diversify product distribution channels, better satisfy consumer demands, carry out overseas expansion and enter new geographic markets. It plays an increasingly important role in building efficient and resilient supply chains and sustainable food systems.

In the food sector, the following business models of digital platforms for e-trade are most in demand today.

Online third-party platforms for food ordering and delivery are aggregation platforms where various suppliers publish their products and customers browse products, place online orders and get delivered to a specific address in their region (FSA, 2021). For example, the world-famous platforms Deliveroo, Uber Eats, Just Eat and others. These digital platforms are becoming more popular and widespread, increasing their reach and penetrating new niches of the food sector, for example, food delivery, virtual restaurants, etc. On these platforms, offline businesses enter digital markets and gain many new online-customers.

Online marketplaces that connect buyers and sellers are digital platforms that enable suppliers to promote their food products and services and act as intermediaries (FSA, 2021). These are online food markets, where food products and services are available to customers, and transactions are carried out within a digital platform. In addition, these platforms can be marketplaces for gastronomic events, marketplaces where food is included in the product range (e.g. Amazon), social markets operating on popular social media, or markets for the redistribution of surplus food from farmers, producers, retailers, restaurants and consumers to reduce food waste. Such digital platforms enable different actors to engage in food e-trade and contribute to food security and sustainability of supply chains and food systems.

A platform operated by a direct producer or wholesaler selling food to the end consumer is the business model which has become increasingly popular in recent years (FSA, 2021). Food manufacturers and wholesalers develop their sales channels and focus on direct-to-consumer delivery through an online sales channel. This allows

producers to avoid traditional middlemen, shorten supply chains, and allows consumers to buy directly from producers, such as local farms and other suppliers.

Dark kitchens (or "cloud"/"ghost kitchens") are offline restaurant-style cooking businesses and related digital platforms that operate on a business-to-business (B2B) model and serve restaurants and other businesses in food sector that require additional capacity (FSA, 2021). Customers usually order online and get fast delivery in their area. Dark kitchens may be owned by a brick-and-mortar business or operate online only as virtual brands, multi-brand kitchens, or provide third-party catering services to other operators under franchise models. This allows small businesses in the food sector to enter the market with minimal costs and risks.

Rapid on-demand delivery solution is a quick-commerce (Q-commerce) digital platform that reduces the time it takes to deliver food to customers by integrating local restaurants and shops, dark kitchens and local courier networks (FSA, 2021). These platforms transform the traditional grocery infrastructure into a dynamic networked digital ecosystem that is flexible and adaptable to changing consumer preferences.

In the future, it is expected that the considered types of digital platforms will be relevant. At the same time, digital technologies will change existing business models and the e-food ecosystem. In particular, online services and Q-commerce will grow in e-commerce. Ecosystems will expand and scale, the number of online stores, marketplaces and other startups in the food e-commerce sector will grow. Online food retailers will introduce digital platforms and enter circular markets, while online players will develop offline services. Data analytics and AI systems will drive technological progress, and big data will be more important for researching consumer behaviour and creating competitive advantages. Due to the dynamic interaction and network effects between suppliers, customers and digital service providers, existing ecosystems will change and adapt to new challenges, creating new players while displacing non-competitive participants in digital markets.

3.2. Global trends in food e-trade through digital platforms

Food e-trade through digital platforms in the B2C and B2B segments has its own specifics. The global experience of e-trade is characterized by the successful implementation of digital platforms and start-ups and their high performance for all participants. Farmers use digital platforms to expand their customer base, enter new markets and showcase their products and services, and access production resources. Digital platforms help reduce costs in supply chains by eliminating middlemen. Digital platforms are the most effective for small and medium-sized food enterprises with small volumes of sales and purchases, which work on platforms thanks to the complete digital transformation of business processes.

World leaders in food markets are also the most competitive in e-commerce. The largest agri-food companies in global digital markets in the B2C and B2B segments are Walmart Inc., Amazon.com Inc., Alibaba Group Holding Ltd., IndiaMART Intermesh Ltd., BigHaat, Bigbasket, Ugaoo, AgriBegri Trade Link Pvt Ltd, Korea Agro-Fisheries & Food Trade Corp, Agrosiaa Agri-commodities Online Services Llp, Krishibazaar, TradeFord, Farmlead, marketplaces FoodDirectories.com, TradeB2B and others (Market.US, 2022; Polaris Market Research, 2022).

Large e-commerce companies (marketplaces) in the food sector, operating on the basis of B2B business models, have created entire online markets for food retailers and small and medium-sized enterprises that make online orders and manage supplies. These platforms provide price transparency and access to markets, help expand business geography and diversify sales channels, help save time and money, and enable customers to receive goods on time at a good price.

Due to the COVID-19 pandemic, food e-trade in the B2C segment has increased locally and globally. Farmers have also gained access to the consumer market through online platforms that provide all trade participants with alternative food distribution channels.

Table 1 shows the main business models and examples of enterprises specializing in food e-trade.

Table 1 – Business models and examples of food e-trade enterprises

Type of business model	Examples of e-commerce enterprises
E-trade as the main business model	Online grocery stores: Mytime (Germany); Ocado (Great Britain); Picnic (Netherlands); HelloFresh (UK, international); Bidfood (B2B, Europe)
E-trade as an additional benefit	Conventional grocery stores with online stores: Tesco (Great Britain; supermarket with the highest online turnover in Europe); Rewe Online (Germany); Bringmeister (Edeka, Germany); Albert Heijn (Netherlands)
Direct suppliers with a high level of service	Specialized farm enterprises with online sales: Van Gelder (Netherlands, wholesale); From farm to consumer
Digital platforms and marketplaces where e-trade is a service	Independent platforms: AmazonFresh; Producers Market; Lima Link; AgriMarketplace; Agritradenet; Eatfromfarms; OURFARM

Source: compiled by author based on websites

As food has a short shelf life, most international traders still prefer traditional offline sales. However, food e-trade is developing and cost-effective, and modern innovative technologies, digital tools and digital management solutions ensure both traceability and freshness. The growth driver of the food e-trade in the B2C segment is the increase in the number of smartphone users, which potentially expands the potential of the food online market.

Supplier and manufacturer costs are the main constraints for the growth of food e-trade. These are current costs, in particular for connecting to the Internet, fulfilling orders, delivery, packaging, fuel and depreciation of transport, payment of drivers and/or couriers, as well as long-term investments, in particular for digital transformation of business, training and personnel development, adaptation of business processes to dynamic market demand, etc. Since most food products have a very limited shelf life, the supply chain must be fault-free, reliable and have zero wastage of resources to maintain a sufficient level of profitability. Thus, supplier costs are holding back the growth of food e-trade (The Business Research Company, 2023).

Diversification of food distribution channels through digital platforms contributes to the sales growth in B2C segment. The main growth factors are guaranteed product quality, a wide assortment and competitive prices. Food e-trade requires efficient

logistics, packaging that is convenient for small sellers, and the ability to track goods.

The organization of online sales in the food sector is implemented mainly through the seller's existing distribution network or cooperation with chain offline stores and supermarkets. E-trade is one of the promotion and sales channels. The format of cooperation depends on the regularity of food supplies and assortment. In particular, part of the fresh produce is shipped to large buyers, and the rest is sold to stores with the highest demand. In Europe, the largest number of online grocery stores is located in Northern Europe, in particular, in Great Britain and the Netherlands (CBI, 2022).

Food retailers have created new services and delivery methods to meet consumer demand, often in partnership with large e-commerce companies and new players on digital markets. For example, the partnership between French food retailer Casino Guichard-Perrachon and German delivery company Gorillas (CBI, 2022). Delivery companies that previously did not work with the food segment have started to do so (for example, Glovo).

Large food retailers with fully digitized internal business processes successfully integrated e-commerce into their omnichannel strategies even before the global COVID-19 pandemic. This has facilitated the adaptation of business models to new realities, as demand for food delivery continues to grow even after the pandemic. Offline retailers and grocers with limited financial and operational capabilities have been able to adapt their business processes to e-commerce at lower costs by partnering with delivery service providers. SMEs, in addition to cooperation with delivery companies, have also changed their business models and operational management, or merged with competitors, or diversified their offer and specialized in niche products (e.g. organic, fresh produce, etc.).

Food enterprises diversify and develop their business thanks to new online sales channels. Offline supermarkets are expanding their online assortment, offering pick-up points and delivery services. For instance, Tesco (Great Britain) is a supermarket with the largest online turnover in Europe. There are new start-ups, online supermarkets that focus on online sales from the start, such as Ocado, Mytime and Picnic, competing with traditional supermarkets. Specialist wholesalers such as Van

Gelder in the Netherlands have implemented a digital platform for online ordering (CBI, 2022). Such companies offer a high level of service and a personalized online experience at the expense of reliable suppliers and on-time guaranteed delivery.

In local markets, small retail companies and farms are also moving online, expanding their customer base. For example, in Germany's online fruit and vegetable market, suppliers sell products directly to consumers. In Spain, small local offline stores expand their customer base through online sales. Farms and small shops prefer online sales in local markets and sell little abroad, due to dependence on local agricultural producers.

Digital platforms offer goods manufacturers the services of an intermediary in finding customers and partners, placing orders and their monitoring, as well as delivery. Most of the sellers on such platforms, working independently and independently, as a rule, are not able to directly reach the target markets and the end consumer.

Global e-commerce companies such as Amazon operate in Europe, as well as numerous little-known local B2B and B2C platforms, where businesses sell food to consumers and provide additional online services. Most digital platforms in the B2C segment focus on local markets.

Within Amazon, the AmazonFresh platform has been organized for consumers from European countries. The marketplace was launched in 2016 in London, and then customers and suppliers from Germany, Italy and Spain joined it. This platform has established sustainable supply chains, new agricultural producers and food retailers are constantly joining it. For example, in Spain AmazonFresh cooperates with the Dia supermarket chain, in Italy – with U2 Supermercato (CBI, 2022).

The global experience of organizing start-ups in food e-trade is distinguished by numerous successful projects. For example, Eatfromfarms is an innovative digital platform where customers post orders and sellers offer products.

Digital solutions for e-commerce and information services are developing in the B2B segment, enabling farmers to sell food products in digital markets at the beginning of the supply chain in producing countries. For example, the Lima Links platform in

Zambia, where farmers receive up-to-date information on market prices and contact buyers, as well as online market "Producers Market", where producers sell goods. The TruTrade Africa platform uses cloud-based mobile and online applications where farmers can go to market and sell their goods at fair prices. There are regional digital platforms, marketplaces where sellers publish information about their products and receive inquiries from potential customers, for example: Tridge, Selina Wamucii, Tradekey, Alibaba and many others.

B2B digital platform OURFARM enables farmers to communicate directly with suppliers and reduce the cost of intermediary services. OURFARM leverages AirAsia ecosystem, which includes transportation services, logistics and payment services, as well as a large database of companies and consumers. The digital solution promotes the development of online trade of small farms without intermediaries, which has a positive effect on the growth of the agricultural sector (Airasia, 2020).

AgriMarketplace is an EU-funded project with the participation of EIT Food. It is a cloud-based digital B2B platform specializing in e-trade and blockchain food delivery tracking. The service increases the efficiency and transparency of food sales in various distribution channels. The digital platform contributes to matching supply and demand in food markets and increasing their transparency. Marketplace specializes in food products and agricultural crops.

The Agritradenet digital platform (project implemented during 2018-2020) is financed under the ENI CBC Black Sea Basin programme. The marketplace operates in the B2B segment, where a farmer can sell his own products on local and global markets, maintaining direct contact with potential buyers – mainly wholesale companies, supermarkets, distributors. Companies from six different participating countries of the Black Sea region work on the marketplace (Prokharava, 2021). This platform enables producers to set prices and conditions themselves, and to sell goods not only in their region, but also in neighbouring countries.

Food e-trade plays a significant role in ensuring food security, especially for regions and households, as online sales contribute to market transparency, increase physical availability of food and stabilize market prices through competition. E-trade

optimizes interaction between counterparties, shortening the time to search for partners, goods and services, speeding up transactions due to online payments.

Farmers and large food enterprises use digital B2B platforms to enter new geographic markets, expand the customer base and optimize the process of interaction with counterparties. Consumers increasingly prefer online shopping, which is contributing to the expansion of digital markets in the food sector and the growth of e-trade volumes.

3.3. Food e-trade in Ukraine: current trends and development prospects

E-trade in the Ukrainian food sector is developing at a faster pace, compared to the general pace of e-commerce development. In Ukraine, 6.7% of food enterprises carried out e-trade in 2021, with a share of 5.3% of e-trade in the total turnover (State Statistics Service of Ukraine, 2023). Over the past 5 years, the volume of online sales in the food sector has been growing.

Quarantine restrictions during the COVID-19 pandemic and a change in consumer behaviour, the emergence and development of Internet delivery services, and an increase in the penetration of the Internet and mobile devices in Ukraine were factors in the growth of food e-trade.

In the B2C food sector, companies sell products through various online sales channels, among which the most common and popular are websites and marketplaces: 2.6% of enterprises sold food through marketplaces, 3.6% through their own websites. The share of food sales through marketplaces was 1.2%, through websites – 2.7% (State Statistics Service of Ukraine, 2023). For comparison, in the EU food sector, 25.4% of enterprises sold food and beverages online in 2022 (22.9% in 2021). This share ranges from 10.5% of enterprises in Bulgaria to 53.4% of enterprises in Denmark, 54.6% in the Netherlands, 65.5% in Ireland, 43.3% in Norway, 48.9% in Sweden, 48, 6% – in Estonia. These countries are the leaders in terms of the number of enterprises engaged in online trade in food and beverages in the B2C segment. The share of online

sales in the turnover of EU food sector enterprises in 2022 was 25.5%, which is less than in 2021 (30.1%). The share of online sales in the total turnover of food enterprises varies from a minimum of 6.2% in Bulgaria to 56.9% in Sweden and 41.4% in the Czech Republic, 45.2% in Norway, 40.2% in Ireland. These countries are leaders in food e-trade in the B2C segment (Eurostat, 2023).

In Ukraine, the scale of digital transformation of the agricultural sector is growing, contributing to the growth of food online trade. In turn, e-trade contributes to the development of digital platforms, the creation of smart services, which makes it possible to conclude contracts online. Blockchain principles increase the reliability and transparency of e-trade. The growth of e-trade and the globalization of the economy contribute to the formation of the M2C (Manufacturer to Consumer) segment and the development of the B2C and B2B segments, when the food production and delivery to the end consumer are available anywhere in the world.

Digital platforms are the main driver of food e-trade, as they help to build stable and transparent relations between sellers and consumers, increase the economic efficiency of sales, have a positive effect on the cost and quality of products, and increase customer loyalty. Table 2 presents the main characteristics of digital platforms in Ukraine in the food sector.

Table 2 – The main digital platforms for food trade in Ukraine

Global platforms that facilitate access to global markets	
Specialized	***Universal***
AGROXY; Tradomatic; Mobile apps Agroportex.Bio, Black Sea Grain & Oil, OrganicHelper, PROD; «Ukrainian food platform»; ProdUkraine	Amazon; Alibaba; AllBiz
Local (within Ukraine)	
Specialized	***Universal***
Trade portals “AGROTORG.net”, AGROBIZ, “Агроринок Херсонщини”, “Agromarket”, “Agrotender”; Informational and trading portals “АПК України”, “АПК Інформ”, “APK-Inform: Vegetables and Fruits”, “Агробізнес сьогодні” Boards “APKUA”, “AGRO Ukraine”; Agrarian Commodity Exchange “Grain Trade”	Rozetka; OLX; Prom

Source: compiled by author

Digital platforms are universal, on which various goods are sold, including food

and agricultural goods, and specialized ones designed for trade in food and agricultural products in Ukraine and abroad. In addition to operating in the B2C and B2B segments, online platforms have different business models and communication strategies.

Most digital platforms work for the Ukrainian consumer. Each of these platforms has from 5 to 1700 thousand unique visitors per month. Traffic dynamics of digital platforms are related to business seasonality. The peak of traffic on specialized digital platforms coincides with the peak of agricultural work (March-April), harvesting and sales (September-October). Some digital platforms are interesting for foreign consumers, but their share in the total traffic is very small.

Digital platforms for trading food, as well as agricultural products and resources for agricultural production, operate in the form of catalogs, auctions and exchanges. The catalogs present the offers of suppliers for target consumers. Online catalogs contribute to the expansion of the customer base and improve the access of buyers to resources for production. Online auctions give sellers a place to showcase their products. The benefit for buyers is the opportunity to buy goods at a lower price, and sellers gain access to new sales markets. The price is not fixed, but is determined during bidding. In Ukraine, auctions are held mainly on the websites of large commodity exchanges. Exchanges are anonymous trading platforms where producers can choose and order goods on the online market, conclude a supply agreement, pay and order delivery. The price on the exchange fluctuates and depends on supply and demand. Exchanges receive income from commissions for transactions and membership fees of participants.

The emergence of marketplaces contributes to the development of online trade in the food sector, reducing the costs of product manufacturers, improving the information provision of market participants, balancing supply and demand, avoiding intermediaries and meeting the needs of consumers (Sak et al., 2020).

Large agricultural enterprises operating in the B2B segment post information about goods on large online platforms, bulletin boards, and stock exchanges. The main task of digital platforms is to facilitate interaction between enterprises, regardless of industry, size or location. Small and medium-sized producers, mainly farmers, sell food

products through marketplaces and online stores. Online stores mainly focus on retail trade, and marketplaces work in both B2C and B2B segments, providing sellers with a platform to list their products.

The main Ukrainian universal marketplaces, where various categories of goods are presented, are Rozetka, Olx, Prom, and foreign ones are Aliexpress, Amazon, Ebay. Among the assortment of goods sold through these Internet platforms, food products make up a small share.

In Ukraine, in the B2C and B2B segments, the international Internet trade platform All.Biz is successfully operating. It presents more than 20 million goods and services from 1.3 million companies from 90 countries. On the platform, clients can search for goods in international, national and regional catalogs. According to the number of posted offers, the group of food products ranks 2nd among the total number of offers. This marketplace makes it possible to sell Ukrainian goods, conclude foreign economic contracts, and establish international relations.

Today, the presence of the agricultural sector of Ukraine in the digital environment is provided by digital platforms and enterprise websites. For example, the AGROXY is the global platform for spot trading of agro-food products with additional features that make trading safe and convenient (verification via BankID, automatic verification via company registers, interactive map of agricultural producers and elevators, online calculator of the cost of storage at the elevator and logistics costs of transportation by rail and road transport, etc.). The platform creates a reliable business environment for domestic and international supply chain management (Kysliuk, 2019).

Online platforms Tradomatic, AGROTORG.net operate in Ukraine, uniting agricultural producers and buyers, local and global traders, agricultural holdings and large agro-enterprises. At the platforms, participants sell and buy basic agricultural products, develop sales channels, look for business partners and conclude deals, conduct market analysis, etc. Various food and agricultural products are available in the corresponding sections of the catalog: grains, legumes, vegetables, fresh fruits, berries, melons, meat, milk and milk products, groceries, products of processing of agricultural raw materials, poultry, cattle, pigs, etc. (Kysliuk, 2019).

The informational and analytical portal "Агроринок Херсонщини" contains a catalog of enterprises and a bulletin board, trading platforms with grain, oil crops and food with prices on the markets of the Kherson region and Ukraine. Users buy and sell grain, seeds, vegetables, fruits.

The platform "Agromarket" provides up-to-date information on current offers to producers, buyers, suppliers and service companies.

About 18,000 companies are represented on the specialized portal "Agrotender", which places about 30,000 ads from more than 20,000 users. The platform was created to support the domestic agricultural producer, publishing the latest news in the agricultural sector of Ukraine.

Online platform "AGROBIZ" is specialized, it presents not only agro-food products and services, but also products for agricultural production, equipment, etc. Clients are both end consumers and large agricultural companies. On the platform, more than 800 suppliers advertise the sale of more than 300,000 food and agricultural products. The platform has about 1.4 thousand headings, the product assortment includes agricultural products, food products, and organic products.

The electronic catalog "APK-Inform: Vegetables and Fruits" is aimed at the needs of the fruit and vegetable business: from producers of vegetables, fruits, berries to processors, wholesalers, equipment suppliers and fruit and vegetable departments of supermarket chains. The portal of the Agrarian Commodity Exchange "Grain Trade" has a built-in trading platform, but it looks more like an electronic bulletin board of suppliers.

Different types of devices are used in online trading, most often – mobile devices and applications. Specialized platforms have applications adapted for mobile devices. For example, the Agroportex.Bio mobile app allows to buy organic products offered by various suppliers from around the world. The marketplace presents about 2,000 offers in 1,000 product categories in the food sector from 400 suppliers. The Agroportex.Bio app is available to food producers with certified products that have passed verification.

The "Black Sea Grain & Oil" mobile application, developed by the

UkrAgroConsult agency, mainly serves contractors from the Black Sea region. It contains updated proposals for grain and oil crops, production and export volumes. More than 100 ads in relevant product categories are posted here every month.

In Ukraine, specialized online platforms and digital tools are being developed to improve the work of farms. For example, the m-Agri business application, developed by the Ministry of Agrarian Policy and Food and Kyivstar, helps small farmers integrate into the online food market. It also contains price offers, news, specialized resources and services, online consultations, etc. Now the functionality of the platform is being refined and in the future it will have a platform for online trading.

The PROD mobile application was developed for farmers within the framework of the USAID project "Support for Agrarian and Rural Development". It allows working with prices for vegetables and fruits throughout Ukraine, publish ads for the purchase/sale of vegetables and fruits, and contact sellers/buyers directly without intermediaries. Another application OrganicHelper is designed for agronomists, farmers, producers in the field of organic agriculture. The platform works as an online catalog of goods and services in the field of organic farming, for example, organic fertilizers, biological preparations for plant protection, seeds and other goods and services. Users have access to consulting services from specialists, opportunities to present goods and services, online training courses on the use of technologies in the field of organic farming, etc.

Logistics and tender platforms and applications, for example, Logitex, Aliro Trade, APS Smart, Lardi-Trans, LogistPro and others, also contribute to the international integration of the Ukrainian producer of agricultural products and food to the world market and the development of business communications.

Food enterprises faced the need to change approaches to their own business models in the conditions of rapid development of digital technologies in trade, logistics and marketing. It gives business new opportunities: quick dissemination of information about goods and services; 24/7 communication with potential partners; reduction of costs for advertising, promotion and logistics; access to global product prices in real time; search for partners worldwide; concluding agreements, signing papers and

financial statements using a digital signature; instant money transactions (Ramírez, 2020). Digital platforms play an important role in export and import of food products. With the help of digital technologies, requests for Ukrainian goods are received, foreign economic contracts are concluded, and international relations are established.

The main problems of food e-trade in Ukraine in terms of economic integration and access to foreign markets are, first of all, ensuring trust between counterparties, guaranteeing and insuring supplies. Today, important steps have been taken to speed up the development of e-trade in Ukraine in the context of Ukraine's integration into the EU Digital Single Market, which will further simplify access to international markets for Ukrainian manufacturers in the future (Kulchytskyy et al., 2019).

3.4. Directions of further development of food e-trade in Ukraine

Food e-trade contributes to increasing the sustainability of supply chains and the emergence of new market participants and business models that have not yet been fully regulated and adapted by Ukrainian enterprises. Therefore, it is necessary at the government level to create a favourable institutional, legal and business environment, to form strategies and to determine priority areas of investment, which are necessary for the sustainable development of e-trade in the food sector. Food retailers must invest in improving their e-trade business models, reorganize supply chains and create sustainable food systems (Reardon et al., 2022).

In Ukraine, it is necessary to attract small and medium-sized businesses to e-trade through new business models of cooperation with partners. The main factors inhibiting the process of joining e-trade of SMEs are: limited human, technical and financial resources, large initial capital investments, for example, the integration of online e-commerce platforms into existing business processes, interaction with delivery companies and organization directly delivery process, increased competition from large food retailers (Ramírez, 2020).

For the development of food e-trade in small and medium-sized businesses, a

number of strategic problems must be solved on the way to the integration of SMEs into urban food distribution systems. In particular, government and regional projects for the development of urban logistics infrastructure and its adaptation to the transformation of the retail trade sector (improvement of urban logistics zones, pickup zones and the master plan of urban logistics) with the involvement of private investors are needed. Modernization of the existing infrastructure is needed, especially wholesale food markets.

Food e-trade in the B2C sector will require sustainable financial and environmental development models. In order for food retailers, especially SMEs, to implement e-trade, it is necessary to invest in digital infrastructure, modern IT solutions, transformation of operational processes and business models (Reardon et al., 2022).

At the state level, it is necessary to create a favourable business environment for e-trade, such as maintaining the sustainability of food supply chains, improving infrastructure, logistics and transportation to improve business efficiency, reduce operational costs, and minimize risks. This requires the creation of programs for the development and modernization of infrastructure, the construction of urban logistics centres, the identification, implementation and improvement of safety and hygiene standards, the expansion of Internet and mobile phone connections in urban and rural/remote areas, and the improvement of access to the digital space. At the state level, it is necessary to implement a policy of promoting e-trade and providing tax benefits in the food sector.

Food retail SMEs such as supermarkets and delivery services need to be helped to realise the e-trade. It is important to create conditions for training employees in e-trade, develop mentoring programs to support SMEs in developing digital strategies and entering online markets, possibly through the platform Diia Business.

Conclusions

For the further development of food e-trade, at the state level it is necessary to create programs for the transition of SMEs in the food sector to the online-to-offline (O2O) business model (Wang, 2019), with the support of producer associations and the State Production and Consumer Service, and to create appropriate content on their websites to support these processes. It is necessary to create programs to improve management processes in e-trade at the level of retailers in such important aspects as: information for the client about the delivery period and tracking of the product; information in real time about the availability of goods in the warehouse; information for clients regarding sanitary and hygienic measures; diversifying the pool of suppliers, mainly for products in high demand, to reduce the risk of shortages.

In addition, it is necessary to motivate SMEs working in e-trade, for example, tax incentives, grant funding and training programs, increasing digital literacy in this area, creating public platforms for promotion, preferential access to marketplaces through the creation of joint digital platforms and start-ups.

At the state level, continue to harmonize the legislative framework with the European one in order to create a more favourable environment for e-trade, as well as to develop and support the transition of SMEs in the food sector to the O2O model. To do this, it is necessary to solve problems with logistics, help improve and optimize business processes and organizational structures, and improve the qualifications of personnel. The transition of SMEs to e-trade will contribute to the diversification of the supply, the growth of competition, market regulation of prices, the reduction of market concentration and the shortening of the value chain of food products.

At the level of large food retailers in online trade, it is necessary to consult, educate and stimulate cooperation with agricultural enterprises, in particular, in the segment of organic products and fresh products. It is important to develop delivery networks and platforms as distribution drives the growing demand for online shopping. In this area, government measures should focus on creating conditions for motivating large food retailers to cooperate with SMEs and farmers, in particular, through tax benefits, public-private partnerships, and start-ups in this area.